warming; the formation of the surface fog largely prevents warming by insolation. The condition, by observation, tends to persist as long as the warm-air mass overlies the water, which may be only a matter of a few hours but can, under extremely stagnant conditions, persist for a day or more.

The layer of fog tends to disappear as it reaches and passes over the airport; but it can become a real hazard to the landing of aircraft when it is particularly dense, under special conditions. It is not often that the winds drift the fog in over the airport, since the field is on the south shore and the fog is most likely to form while southerly winds prevail; but when there is little pressure gradient, variable winds due to local temperature differences between the cold water and the warmer adjacent land may cause a slow landward drift to set in, which brings the fog over the airport.

When the wind is fresh, fog is not observed; with a moderate to fresh wind it may form, but seldom is a hazard, since at such times the circulation is so well controlled by pressure gradient that local effects are overcome. With light to moderate winds, the fog is almost invariably present over the lake during otherwise favorable conditions, appearing to an observer as a whitish gray roll of vapor at a distance that varies with (1) the wind velocity; (2) the moisture content of the overlying air mass; (3) the difference in temperature between the latter and the water surface.

The depth of the fog varies from a few feet, when it is barely distinguishable, to probably more than 100 feet under extreme conditions. At times the top of the layer presents a billowy appearance as the shifting variable winds bring about changes in the direction of drift, but the top of the layer is usually about level.

As the fog drifts in over the airport, if it persists long enough to reach the south side of the field (where the lake shore used to be) and passes out over the level country beyond, the barrier formed by the administration building and the two large hangars (one on each side of the administration building) gives rise to a peculiar condition to the south, with no fog over the area to the leeward of the buildings, while on either side the fog flows on with the surface currents drifting inland.

TROPICAL DISTURBANCES, JUNE 1936

By I. R. TANNEHILL

[Weather Bureau, Washington, July 1936]

June 11–17.—This disturbance, the first of the season, was in evidence in the radio reports on June 11; in the extreme northwestern Caribbean Sea, pressure was below normal with some indications of a cyclonic wind system in the Gulf of Honduras. The reports at hand do not show more definite cyclonic development until 8 p. m. E. S. T., of June 12, when the center was near the northeastern tip of Yucatan. The report from Cozumel Island gave pressure 29.56 inches, wind northwest, light. The disturbance was then moving toward the north-northwest. After passing into the Gulf of Mexico it turned to the northeastward.

The center crossed the Florida Gulf coast about 20 miles south of Fort Myers at 1 a. m., E. S. T., on June 15. During the 15th its course lay slightly south of east across Florida. The center passed directly over Miami with a lull in the wind from 8:03 a. m. to 8:23 a. m. of the 15th.

At 3 a.m., E. S. T., of June 16, the S. S. *Mayari*, at about 26° N., 73° W., reported wind west, force 8, lowest barometer reading (2 a.m.) 29.57 inches.

The center of the disturbance was located at about 30½° N., 69½° W., at 7 a.m. of the 16th. Twelve hours later it was a short distance northwest of Bermuda, where the barometer read 29.48 inches with wind south, force 8. The rate of progressive movement of the disturbance on the 16th and late on the 15th was rapid.

At no time in its history is this disturbance known to have been of hurricane intensity. The highest wind velocity at Miami was 39 miles an hour from the northeast. Wind velocities of 30 to 40 miles an hour were estimated at points elsewhere on the mainland of extreme southern Florida. No extensive damage was caused by the winds. There were torrential rains of 8 to 15 inches in some places in southern Florida, flooding highways and lowlands and causing much inconvenience and some damage. There was some loss of livestock from drowning. A Coast Guard airplane while in search of small boats, fell in Tampa Bay on the morning of June 15 and three Coast Guard employees in the plane lost their lives.

The first advisory message was issued at 9:30 p. m., E. S. T., on June 12 and timely advices were continued at frequent intervals thereafter until the disturbance had passed well to the northeastward of Bermuda on the 17th. Storm warnings were widely disseminated in southern and western Florida on the morning of the 14th, nearly 24 hours before the center of the disturbance crossed the southern part of the State.

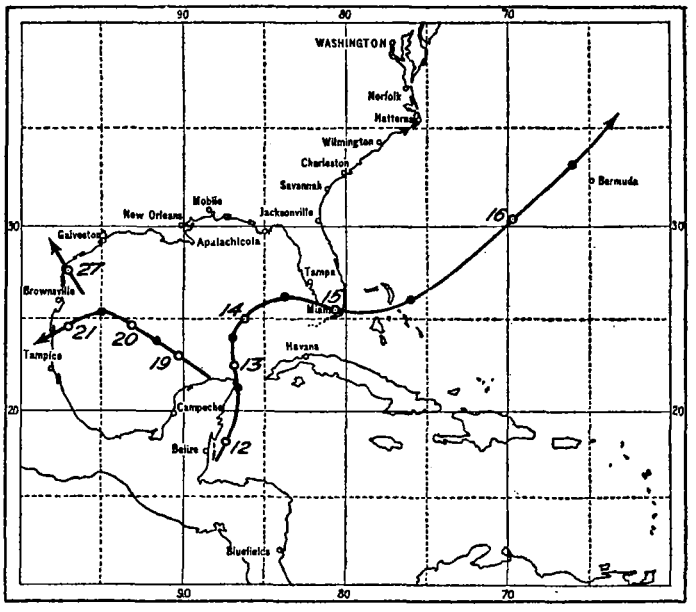
It is worthy of note that on June 8 and 9, just prior to the appearance of the disturbance in the Bay of Honduras, a tropical cyclone was reported in the Pacific Ocean off Guatemala. At 9:30 p. m. (local time) of the 8th the S. S. *Nordhval*, at about 13°45′ N., 94°30′ W., experienced increasing northeast winds. On the 9th when at approximately 13° N., 93° W., she reported east-southeast winds, force 9, barometer 29.18 inches (uncorrected). The wind then shifted to SE. and S., force 10, then to SSW., diminishing. This and other reports indicate that this cyclone was moving northeastward toward the coast of Guatemala on the 8th and 9th. While there are no further ship reports in the Pacific that connect this storm directly with the disturbance which appeared on the 11th in the Bay of Honduras yet there were heavy rains on the 9th and 01th in Yucatan, and British Honduras, with pressure and wind changes that indicate that this disturbance crossed to the Caribbean Sea.

June 18–21.—On June 18 squally weather was reported a short distance north of Yucatan without, however, any definite cyclonic circulation. Radio reports on the 19th indicated the presence of a tropical disturbance to the northwest of Yucatan. The disturbance moved in a northwesterly direction until the evening of June 20, when it was located approximately at 25° N., 95° W., after which it turned toward the southwest, crossing the Mexican coast between Brownsville and Tampico, probably near Sota la Marina.

There are no reports to indicate that this disturbance attained more than moderate intensity. The steamship *Louisiane* encountered the storm on the 20th and 21st and experienced wind force 8 from the north-northwest

with barometer reading 29.66 inches at 1 a. m., E. S. T., on June 21, at about 23°45′ N., 96°35′ W. The steamship *Arsa* at 1 p. m., E. S. T., on June 20, in latitude 25°20′ N., longitude 94° W. reported east wind, force 8, barometer 29.56 inches. At midnight (local time) of the 19th to 20th, the steamship *Cayo Mambi* near 25° N., 90° W. had wind east, force 8, barometer 29.68.

The first advisory was issued at 10 p. m., E. S. T., on June 19. Advices were continued at 6-hour intervals thereafter until the disturbance moved inland. During the 20th, storm warnings were hoisted on the Texas coast from Matagorda Bay to Brownsville. Special precautionary advices were issued because of the likelihood of many persons visiting islands and other exposed places along the coast during the week end. Although tides were somewhat above normal, the change in the path of the disturbance resulted in less severe conditions than had been anticipated.



June 26–27.—A tropical storm of small diameter appears to have developed near the coast between Brownsville and Corpus Christi on the night of June 26 to 27. The first indication of the disturbance was a rapid increase in the velocity of the wind from north by east at the Port Aransas Coast Guard station about 8 a. m., E. S. T. Pressure at that time was approximately 29.70 inches. By 9:45 a. m. the wind had reached an estimated velocity of 80 miles an hour from west-northwest. Lowest pressure was 29.32 inches at 10 a. m. Thereafter the barometer rose rapidly to 29.86 inches at noon. The following is quoted from the report of the official in charge of the Weather Bureau Office at Corpus Christi:

The calm center of the storm passed Aransas Pass between 11:15 a. m., and 11:30 a. m., (90th meridian time) and wind velocities from the NW. decreased from 80 m. p. h. to 15 m. p. h. within a few minutes, then increased to about 60 m. p. h. from the west. However, the wind soon decreased rapidly and the storm was practically over at noon. The calm period lasted about 15 minutes at Aransas Pass. A quiet period occurred at Corpus Christi about noon. The clouds broke rapidly, and the sun shone for a few minutes, and the rain almost ceased. Wind velocities decreased from 36 m. p. h. at noon to 12 m. p. h. at 12:07 p. m., then increased rapidly to 26 m. p. h. at 12:15 p. m., and to 30 m. p. h. at 12:24 p. m. After that, except for a rather heavy shower at 12:30 p. m., and fresh to strong gusts of wind, the wind decreased to eight m. p. h. at 2 p. m. The rain ended at 1 p. m.

From Port Aransas the storm moved northwestward over the southern portions of Aransas, Refugio, and Bee Counties and into Live Oak County, with diminishing force. Its further movement to the vicinity of Eagle Pass was evidenced only by heavy to excessive rain.

No deaths or injuries were reported. Damage occurred chiefly in the area surrounding Corpus Christi Bay. Total damage was estimated at $550,000, mostly to oil-refining property. There were severe crop losses in San Patricio County and in the extreme eastern portion of Nueces County.

Small craft warnings were hoisted in the Corpus Christi area at 9:15 a. m., C. S. T., of the 27th, northwest storm warnings at 9:40 a. m., C. S. T.; hurricane warnings from Corpus Christi to Matagorda Bay were ordered at 10:30 a. m., C. S. T.

The following is taken from a description of experiences in this storm by Leon Davis, master of the fishing vessel *Sea Gull:*

The *Sea Gull* left Port Aransas Friday morning June 26th for the snapper banks. Having reached a point 51 miles E. 1–2 N. from Port Aransas she anchored, the crew preparing to fish. The sea at that time was smooth, except for some choppiness, frequently occurring in the Gulf. A few cu. nb. appeared, all having rainbows at the top. About 9:30 p. m. the wind began to increase to a fresh breeze from the south; soon "scud" clouds appeared, with dashes of rain. This continued until 11 p. m., when the wind became a strong gale backing to east, and rain became steady and heavier. A whole gale was blowing at 2 a. m., with torrential rain, and between that time and 4 a. m. hurricane winds occurred, the direction E. and ESE., backing still farther to ENE. shortly after 4 a. m. The wind lulled somewhat after this, but continued to blow a whole gale most of the time. Hurricane winds again blew about 7 a. m. mostly E. and ENE. These hurricane winds continued, with some periods of intermission, until about 9 a. m. when the calm center reached the vessel. Suddenly the wind died down, the sun shone brightly, and the rain ceased. For a space of about a mile and a half, a clear circular area prevailed, the dense curtain of rain being seen all around the edge of the circle, and the roar of the wind being heard in the distance. Inside this clear circle the air was oppressive, and foul, with an odor like escaping gas; hot and cold puffs of wind blew alternately; there was a disagreeable feeling, like a scarcity of fresh air. Thousands of birds, both land and sea birds, milled about in this circle; also swarms of butterflies, and moths. Some of the birds fell exhausted on the deck of the boat. The barometer in this circle read 29 inches (29.16 inches, corrected). The heaviest seas of the storm occurred just before entering the center, and were as heavy as ever experienced by this crew in the Gulf of Mexico. After about 15 or 20 minutes the other side of the storm raged, winds now blowing from the W., WNW., NW., SW., and finally S. The storm died down with remarkable suddenness after the center passed, and by noon the storm was over, except for excessive roughness of the sea, which lasted all afternoon, and into the night, while the vessel was homeward bound. The wind and waves removed the paint from the hull of the *Sea Gull.* She almost capsized several times, only skillful handling preventing it. The maximum velocity occurred about 4 a. m., estimated 80 to 85 m. p. h. After the center passed wind did not exceed 70 m. p. h.